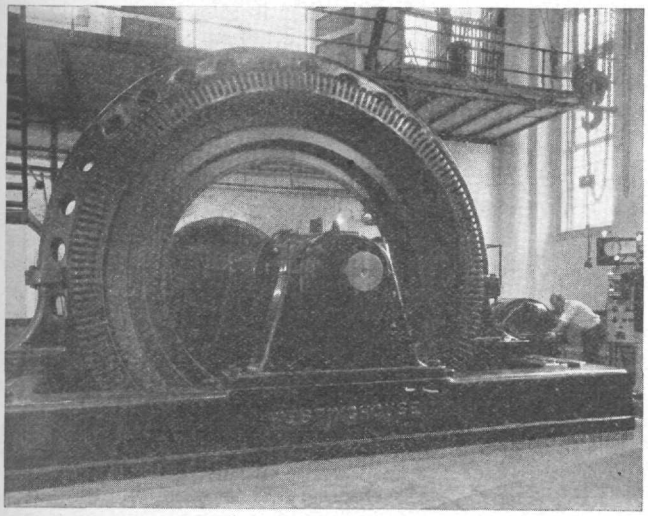
Engineering Review



Marathon Ride Goes to Waste

If a fly had inadvertently climbed upon the rotor of the water wheel generator of the Sturgeon Falls power plant at Vulcan, Michigan, 26 years ago, it would have been "taken for a ride" equivalent to more than 725 times around the earth at the equator, according to an estimate by engineers of the Westinghouse Electric and Manufacturing Company, builder of the machine.

Except for a few shutdowns for inspection and several on account of low water on the Menominee River, the generator has been operating continuously since its installation in 1906. Oil and brushes have been its only expense. The original bearings and windings are still giving daily service.

Even when one coil was punctured by lightning about 20 years ago, the sturdy Westinghouse machine did not give up. The damaged coil was simply disconnected and the machine restarted.

The generator furnishes the equivalent of 2800 horsepower to the mine hoists and compressors of the Penn Iron Mining Company. Emil T. Miller, who assisted in the machine's installation years ago, and is now plant engineer, verifies its marathon record.

Radio Equipment For New Haven Railroad

With the cooperation of the New Haven Railroad Company, Westinghouse engineers installed an experimental five meter radiophone system on one of the road's regularly operating freight trains. Complete two-way radiophone equipment is installed on both engine and caboose of the train permitting the engineer and brakeman to communicate at all times without difficulty.

The equipment consists of an ultra-high frequency transmitter and receiver with microphone and loud speaker located in the engine cab and duplicate equipment located in the caboose. Separate antennae are used for transmitting and receiving. The two antennae used on the engine equipment are located on the front end of the engine and are connected to the transmitter and receiver located in the cab of the engine by means of two-conductor transmission lines. The antennae for the rear end of the train are located on the two sides of the caboose. The equipment operates from a six volt storage battery supply and is capable of about 30 hours' operation without recharging.

The Westinghouse Company has been experimenting for many years on the railroad radio system, the first installation being on the Virginian Railroad in 1925. Other installations followed in 1927 and 1928. Those earlier installations were on a wavelength of 125 meters (approximately) and equipment was comparatively large and expensive. In contrast to this, the present equipment is extremely simple and small and is relatively inexpensive. Now tubes and intensive research on ultra high frequencies have permitted these new sets to be developed and installed experimentally in actual service.

The new equipment operates on a wavelength of five meters and the waves have a tendency to follow the tracks, which is very desirable from an operating standpoint, and tends to minimize possible interference with other types of radio service. In addition, these short wavelengths are conveniently limited in their travel even on regular service other than on railroads. A large number of transmitters may be operated on the five meter band without interference with one another so long as they are a few miles apart.

The transmitter is started in operation by the pressing of a button located on the hand microphone within easy reach of the locomotive engineer. The receivers of these equipments are kept in continuous operation while in service. A loud speaker operating at high volume is located beside the engineer so as to provide sufficient signal above the noise of the tracks and other trains.

It is expected that many installations of this radio equipment on railroads will follow in view of the tremendous possibilities of this form of communication. Manufacturing of equipments will be handled at the company's Radio Division in Chicopee Falls, Mass.

A southern darky when asked why so few colored people committed suicide, answered: "As I gits it, Boss, it's worry w'ot makes people kill 'emselfs, en' when a niggah's worried en' sits down ter think, why, he jist nacherly goes to sleep."

Electric Arc Arrester

Without introducing mechanical devices to suppress the arc, it is possible to speed a. c. arc extinctions with a simple, rugged, single-break type of contactor by inclusion of an "arc arrester." This recent development by Westinghouse for mounting on the base of a contactor or linestarter involves a small unit consisting of a small capacitor and resistor connected across the poles on the load side of the contacting device.

Effectiveness of the development is said to be startling. Oscillograms show less than one-half cycle arcing with the arc arrester as against a persistence of five to eight half cycles under otherwise identical conditions without it. This example involved tests at 550 volts, 60 cycles with a 7½ HP. motor, rotor locked, as load.

In practical installations, but one unit is required for a three-phase contactor and relief is afforded not only for the contactor, or linestarter upon which it is mounted, but also for any disconnect, operating switch, fuse or other rupturing device connected ahead of the contactor. On three-phase reversing service, but one "arc arrester" is required as it acts with equal effectiveness to relieve either the forward or reversing contactor.

Human-Eye Camera

Engineers in Camden, N. J., laboratories recently examined a queer little camera-like box which is said to be the mechanical approach to the human eye. This new instrument is called the "iconoscope" by its inventor, Dr. Vladimir K. Zworykin. The invention of the iconoscope is said to remove the last serious obstacle to practical television.

The three outstanding features of the iconoscope are that it is portable, outdoor scenes can be put on the air, and it has no mechanical moving parts.

Dr. Zworykin succeeded by discarding current ideas and going back to the first principles of television. His mechanical eye uses a lens to project an image of a scene upon an artificial retina which is the key to the whole invention. It is a mosaic of millions of microscopic photo-electric cells. A metallic coating on the back of the insulating mica sheet and a silverized portion of the eighteen-inch tube in which the retina is housed, serve as terminals for the electric circuit, which is regarded as the optic nerve. The retina is housed in a cathode-ray tube which hurls a narrow beam of electrons at the mosaic of photo-cells. The tube is enclosed in a yoke of four electromagnets which swing the beam back and forth across the retina at twenty miles a minute.

When exposed to light the photo-cells are electrically charged and when the cathode beam shines upon a light struck cell it discharges it. As a result there is a sudden fluctuation in the voltage of the electric circuit. Each of the cells waits its turn to go on the air and report on the lightness or darkness of its sector of the picture. So rapidly does this take place that the entire picture is scanned twenty times a second.

Dr. Zworykin several years ago invented a receiver called the "kinescope," to be used in the home. It also uses a carthode-ray tube. Thus at one stroke the new invention brings televison to a point where it is ready for the home and public use.

—*Popular Science.*

"I've just been having a tussle with the dentist."

"Who won?"

"Oh, it ended in a draw."